Expert Systems with Applications

An International Journal

LIST OF CONTENTS
AND
AUTHOR INDEX
VOLUME 3, 1991

Pergamon Press
New York Oxford Seoul Tokyo

EXPERT SYSTEMS WITH APPLICATIONS

An International Journal

EDITOR-IN-CHIEF

Jay Liebowitz, D.Sc.
Department of Management Science
George Washington University
Washington, DC 20052

EDITORIAL ADVISORY BOARD

Edward Feigenbaum
Stanford University, USA

Lance B. Eliot
University of Southern California, USA

Y. T. Chien
National Science Foundation, USA

Dianne C. Berry
University of Oxford, UK

Dan Yurman
EG & G Idaho, USA

Walter Reitman
Rensselaer Polytechnic Institute, USA

Shri K. Goyal
GTE Laboratories, USA

Daniel E. O'Leary
University of Southern California, USA

Richard G. Vedder
University of North Texas, USA

James L. Rash
NASA Goddard Space Flight Center, USA

Louis L. Odette
Applied Expert Systems, Inc., USA

Randall Shumaker
Naval Research Laboratory, USA

David Bendel Hertz
University of Miami, USA

A. Desai Narasimhalu
National University of Singapore

Patricia Lightfoot
NASA Goddard Space Flight Center, USA

Larry Harris
AI Corporation, USA

Mark Fox
Carnegie-Mellon University, USA

Jae Kyu Lee
Korea Advanced Institute of Science and Technology

I. Burhan Turksen
University of Toronto, Canada

David J. Gorney
Rawson Technologies, Inc., USA

Ernest H. Forman
George Washington University, USA

David King
Execucom Systems, USA

Roar Fjellheim
Computas Expert Systems, Norway

Milton White
International Association of Knowledge Engineers, USA

Jon R. Wright
AT&T Bell Laboratories, USA

Roy Rada
University of Liverpool, England

John P. Coyne
George Washington University, USA

John H. Carson
George Washington University, USA

Daniel Schutzer
Citicorp Investment Bank, USA

Paul Harmon
Harmon Associates, USA

Francisco J. Cantu
Instituto Tecnologico y de Estudios Superiores de Monterrey, Mexico

Masao Matsumoto
NEC Corporation, Japan

Patrick F. Perez
Neuron Data, USA

Brian Gaines
University of Calgary, Canada

Peter E. Hart
Syntelligence, USA

Michel Clerget
Cognitech, France

Kenneth J. Fordyce
IBM, USA

James R. Slagle
University of Minnesota, USA

Eliot Weinman
Software Productivity Group, USA

Randall Davis
Massachusetts Institute of Technology, USA

David J. Mischelevich
Viewpoint Engineering, USA

E. Balagurusamy
National Centre for Expert Systems, India

Steven H. Kim
Massachusetts Institute of Technology, USA

Dietter Specht
IPK/Berlin, Germany

Vladimir Milacic
University of Belgrade, Yugoslavia

N. Rao Machiraju
Apple Computer, Inc., USA

Hans Bergkvist
ATTEXOR S. A., Switzerland

Laura C. Davis
U.S. Navy Center for Applied Research in Artificial Intelligence, USA

Daniel De Salvo
Intellimetrix, USA

Jerald Feinstein
MITRE, USA

Efraim Turban
Eastern Illinois University, USA

Bernt Bremdal
GeoKnowledge, Norway

Editorial Office: Jay Liebowitz, School of Government and Business Administration, Department of Management Science, George Washington University, Washington, DC 20052.

Publishing, Subscription, and Advertising Offices: Pergamon Press, Inc., 395 Saw Mill River Road, Elmsford, New York 10523, USA, INTERNET "PPI@PERGAMON.COM"; or Pergamon Press plc. Headington Hill Hall, Oxford OX3 0BW, England.

Published Quarterly. *Annual Institutional Subscription Rate* (1992): £85.00 (US$135.00). *Two-year Institutional Rate* (1992/93): £161.50 (US$265.50). *Personal Subscription Rate* (1991): US$71.00. Sterling prices are definitive. US dollar prices are quoted for convenience only, and are subject to exchange rate fluctuation. Prices include postage and insurance and are subject to change without notice. Notify 8 weeks in advance of address change with a copy of the subscription mailing label. Back issues of all previously published volumes, in both hard copy and on microform, are available direct from Pergamon Press. Subscription rates for Japan are available on request.

Copyright © 1991 Pergamon Press plc.

Copyright Notice. It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature, and translations. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Photocopying information for users in the U.S.A. The Item-Fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

Permission for other use. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for copying. Please contact the Subsidiary Rights Manager at either Pergamon Press Inc. or Pergamon Press, plc.

The Item-Fee Code for this publication is: 0957-4174/91 $3.00 + .00.

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

Printed in the USA.

LIST OF CONTENTS

Volume 3, Number 1 1991

CONTENTS

Special Issue:
Expert Systems for Accounting, Auditing, and Tax

Carol E. Brown	1	*Guest Editor's Preface:* Expert Systems for Accounting, Auditing, and Tax
Carol E. Brown	3	Expert Systems in Public Accounting: Current Practice and Future Directions
Chidanand Apté **John Kastner**	19	An Object-Centered Representation for Financial Analysis
J. Efrim Boritz **Anthony K. P. Wensley**	27	An Expert Systems Approach to Substantive Audit Planning
Arun Sen **Wanda A. Wallace**	51	An Expert Systems Assistance to Internal Audit Department Evaluation
Robert L. Black **Gary Grudnitski**	67	TaXpert: An Expert System to Determine Stock Ownership According to Rules of the Internal Revenue Code
I. S. Torsun **K. J. Manning**	83	Application of Temporal Logic to Tax Regulations
Mohammad J. Abdolmohammadi **Mohammad S. Bazaz**	99	Identification of Tasks for Expert Systems Development in Auditing
Anita S. Hollander **Rhoda C. Icerman**	109	Capital Budgeting in Governments: The Feasibility of Artificial Intelligence Technology
Jagdish S. Gangolly **Timothy P. Hedley** **Che-Tung Wong**	117	Semantic Knowledge Bases for Financial Accounting Standards
David S. Murphy **Mary Ellen Phillips**	129	The Effects of Expert System Use on Entry-Level Accounting Expertise: An Experiment
James V. Hansen **William F. Messier, Jr.**	135	Artificial Neural Networks: Foundations and Application to a Decision Problem
Daniel E. O'Leary	143	Artificial Intelligence and Expert Systems in Accounting Databases: Survey and Extensions
Gary Howorka **Laura Moeur** **Michael Goul**	153	The Design of Co-Audit: An Experimental Testbed System to Support Research on the Next Generation of Audit Technology
	171	NTIS Section
	I	Software Survey Section
	V	New Patents

Volume 3, Number 2 1991

CONTENTS

Special Issue:
Expert Systems in Scandinavia

Bernt A. Bremdal **Roar Fjellheim**	177	Guest Editors' Note
Erik Hollnagel	179	The Pragmatic and the Academic View on Expert Systems
Staffan Löf **Björn Möller**	187	Knowledge Systems and Management Decision Support
Fridtjov Øwre **Svein Nilsen**	195	Integration of a Real Time Expert System and a Modern Graphic Display System in a Swedish Nuclear Power Plant Control Room
Ilkka Priha	207	FAKS—An On-Line Expert System Based on Hyperobjects
Asbjørn Andersen **Klaus Heje Munch**	219	Automatic Generation of Technical Documentation
Stig Arff **Geir Hasle** **Gisle Stokke** **Jan C. Gjerløw**	229	AI Approaches to Production Management
Jyrki Kontio	241	Matias: Development and Maintenance of a Large but Well-defined Application
Christian Liisberg	249	Possible Low-Priced, Robust Expert Systems Using Neural Networks and Minimal Entropy Coding
Kristian Sandahl **Henrik Eriksson** **Thomas Padron-McCarthy** **Tomas Sokolnicki** **Bengt Österlund**	259	Meeting the Requirements of Knowledge Management
Inge Nordbø **Mette Vestli** **Ingeborg Sølvberg**	269	METAKREK: Knowledge Acquisition as Modeling
Matti Katajamaki	277	Knowledge-Based CAD
Pirkko Nykänen **Pirjo Nuutila**	289	Validation and Evaluation of a System for Thyroid Disorders
	297	NTIS Section
	I	Software Survey Section
	V	New Patents

Volume 3, Number 3 1991

CONTENTS

Special Issue:
Knowledge-Based Simulation

Paul A. Fishwick	301	*Guest Editor's Preface:* Knowledge-Based Simulation
Jhyfang Hu **Jerzy W. Rozenblit**	303	Knowledge Acquisition Based on Explicit Representation

Paul A. Fishwick	317	Extracting Rules from Fuzzy Simulation
Bernard P. Zeigler **Jerzy W. Rozenblit** **Eric R. Christensen**	329	Reducing the Validation Bottleneck with a Knowledge-Based, Distributed Simulation Environment
Tag Gon Kim	343	Hierarchical Development of Model Classes in the DEVS-Scheme Simulation Environment
D. Stirling **S. Sevinc**	353	Combined Simulation and Knowledge-Based Control of a Stainless Steel Rolling Mill
Michael Eisenberg	367	The Kineticist's Workbench: Qualitative/Quantitative Simulation of Chemical Reaction Mechanisms
	379	NTIS Section
	I	Software Survey Section
	V	New Patents

Volume 3, Number 4 1991

CONTENTS

Lin Wang **Alan L. Porter** **Scott Cunningham**	383	Expert Systems: Present and Future
Trevor Bench-Capon **Roy Rada**	397	Expert Systems in the UK: From AI to KBS
David Hamilton **Keith Kelley** **Chris Culbert**	403	State-of-the-Practice in Knowledge-Based System Verification and Validation
Bharat Ruparel	411	Designing and Implementing an Intelligent Database Application: A Case Study
F. Nelson Ford **Bruce R. Lewis** **Rebecca B. Wynne**	431	Knowledge-Based System Support for the Information Center's Troubleshooting Function
Francisco J. Cantu-Ortiz	445	Expert Systems in Manufacturing: An Experience in Mexico
W. L. Goh **K. T. Lau**	457	ESMP—Expert System for Medicine Prescription
Barin N. Nag **Atish P. Sinha**	463	ESOM: An Expert System for Multicriteria Scheduling
Robert J. Kirsch **Dennis D. Strouble** **Wayne A. Johnson** **Stan G. Aungst**	481	Transfer: An Expert System Approach to Transfer Pricing
Reuven R. Levary **Laurence A. Madeo**	489	Expert System-User Integrated Adaptive Systems
Peter Klein	499	The Safety-Bag Expert System in the Electronic Railway Interlocking System Elektra

Gayle J. Yaverbaum **Mary Ann Reynolds**	507	Managerial Problem Identifier (MPI): Integrating Expert System and Decision Support Technologies
Anita J. La Salle **Larry R. Medsker**	517	Computerized Conferencing for Knowledge Acquisition from Multiple Experts
	523	NTIS Section
	I	List of Contents and Author Index Volume 3, 1991
	IX	Software Survey Section
	XIII	New Patents